

Knowledge Application Generates Transformation

National Conference on Engineering Technology
2013

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SCOPE

1. Background
2. Knowledge vs Application of Knowledge
3. Transformation
4. Implementation via Engineering Technology
5. Initiative at MTUN and UMP
6. Wayforward

APPLIED KNOWLEDGE

NOTESVALLEY.COM

"Knowledge isn't power until it is applied."

~ Dale Carnegie

APPLIED KNOWLEDGE

NOTESVALLEY.COM

"Knowledge is only useful if you do something with it."

Jeffrey Pfeffer
Professor, Stanford Graduate School of Business

What makes the differences?

American	Russian	Japanese
		
Announced to the world of a new invention!	Claimed it was discovered by them 20 years ago!	Started to produce and sell!

POWER OF APPLIED KNOWLEDGE

With 0% basic R&D + 0% Product/Theory → Solve Industrial Problem Through Applied R&D

KAO Industry

↓ 1 month To automate manual process

KYOTO UNIVERSITY

Relevance extensive literature search

↓ 1 month Hire Lecturers & MSc Students

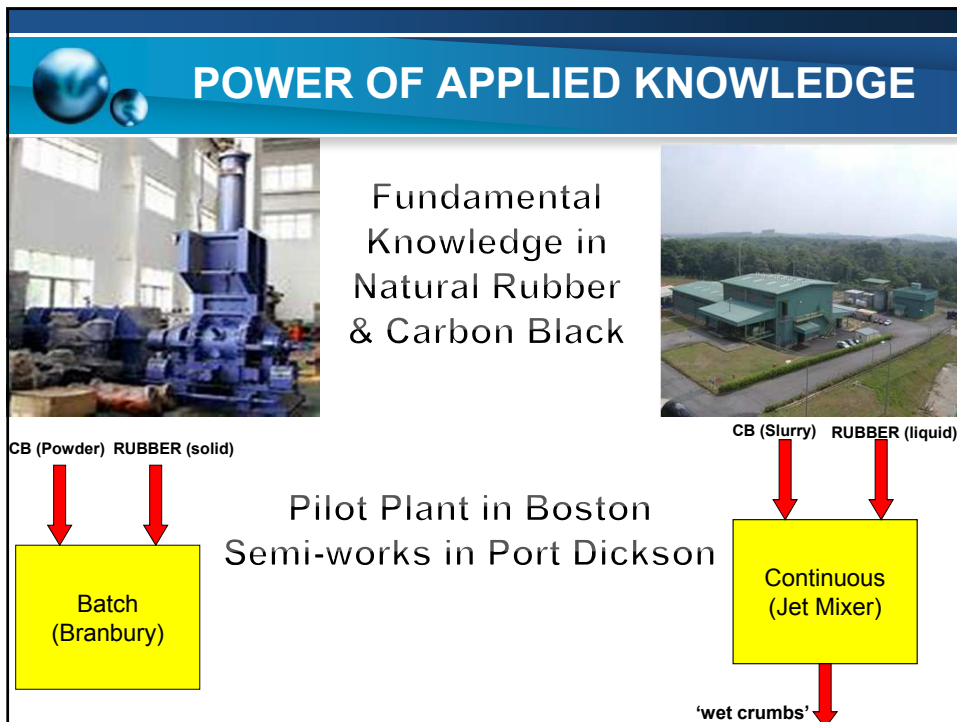
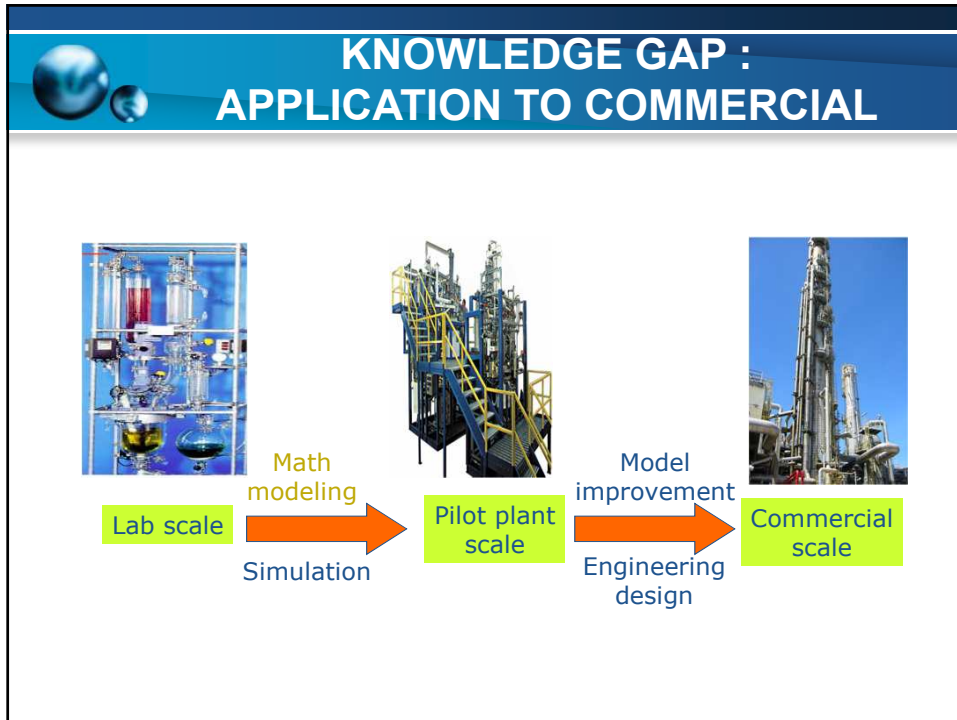
Seminar

↓ 2 month

Data (Validate, Simulation)

↓ 2 month

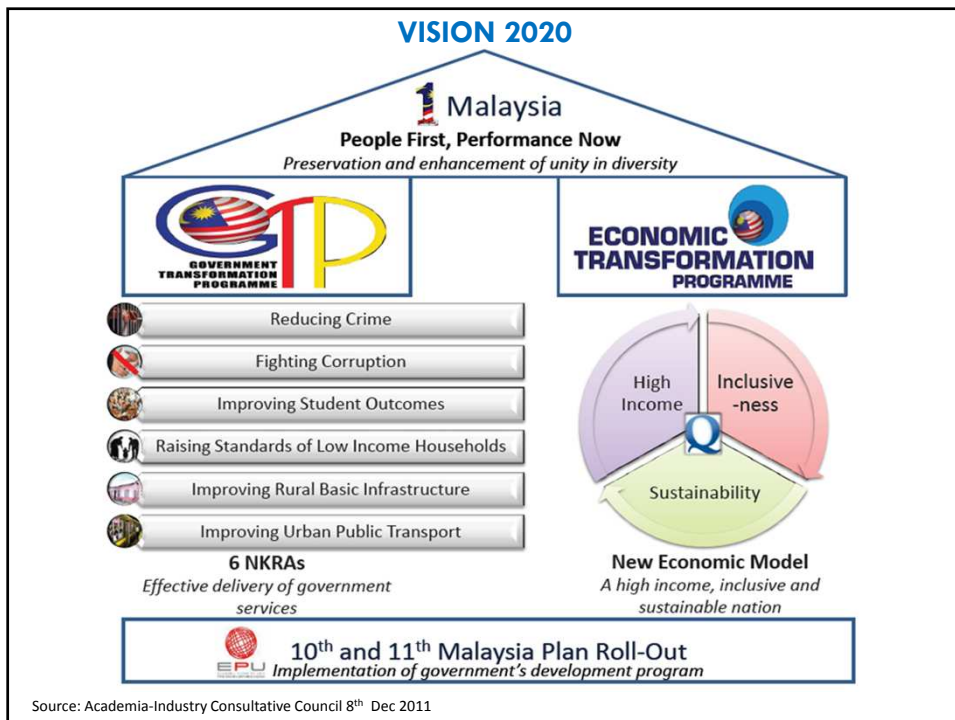
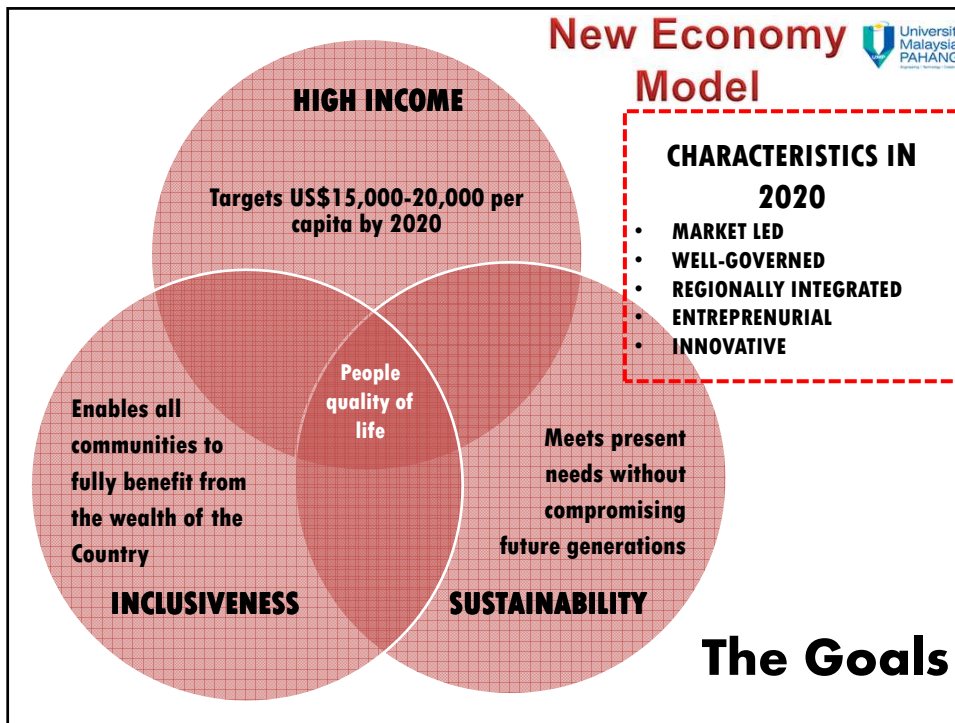
Implementation (real world)



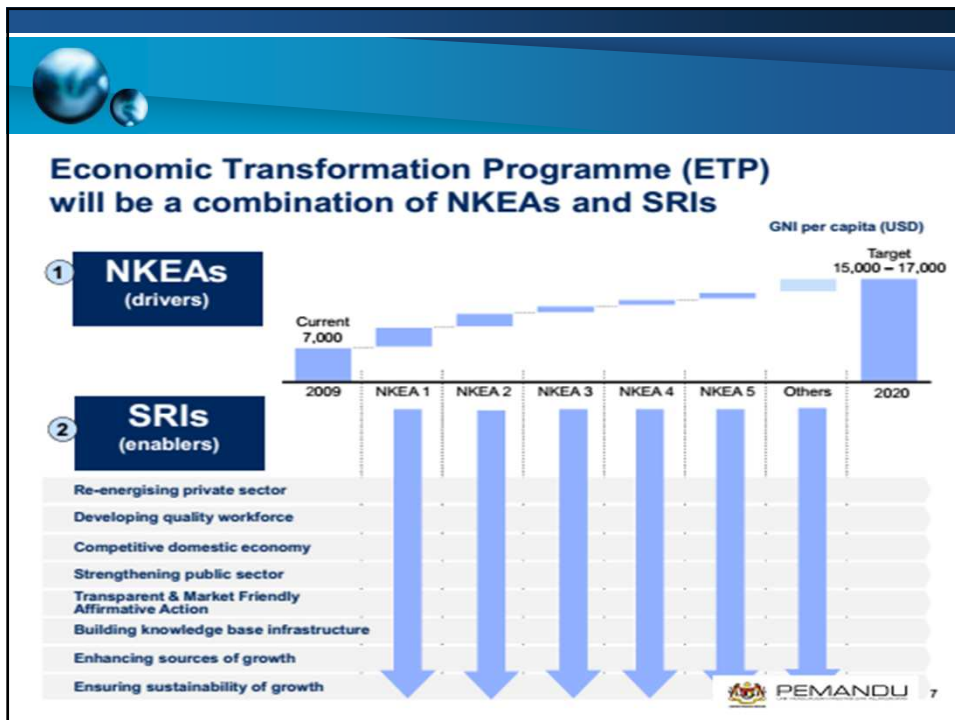
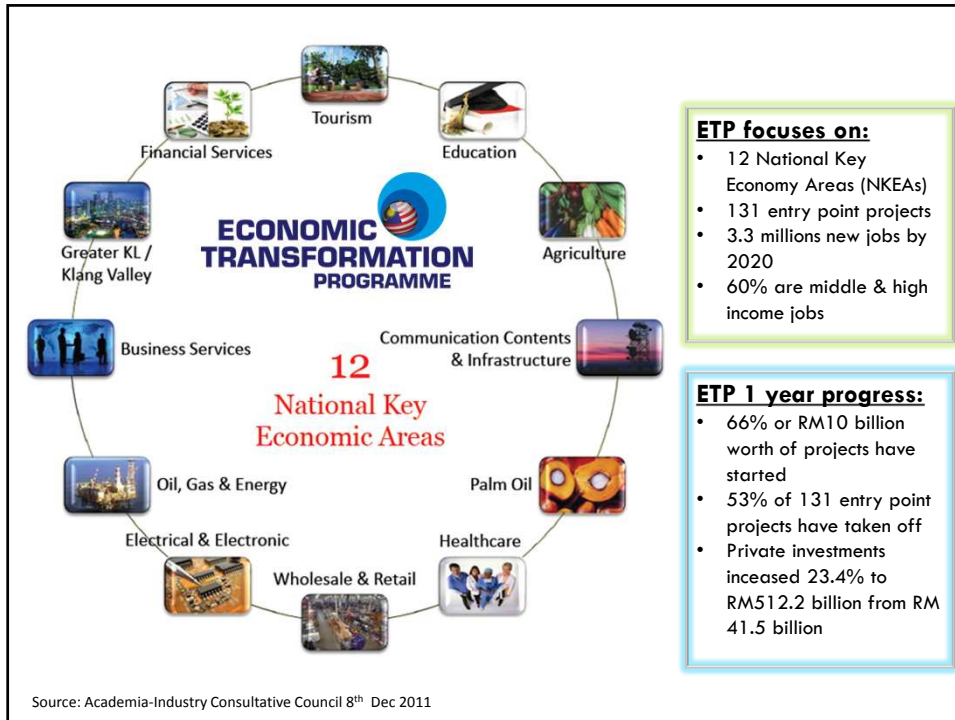
MALAYSIAN SCENARIO ...

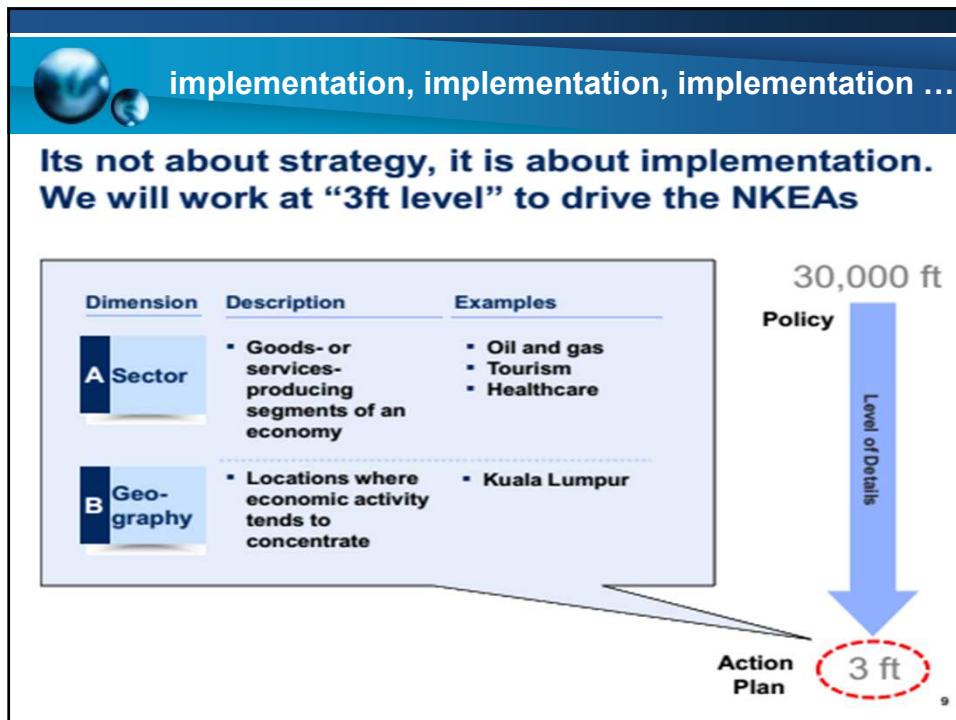
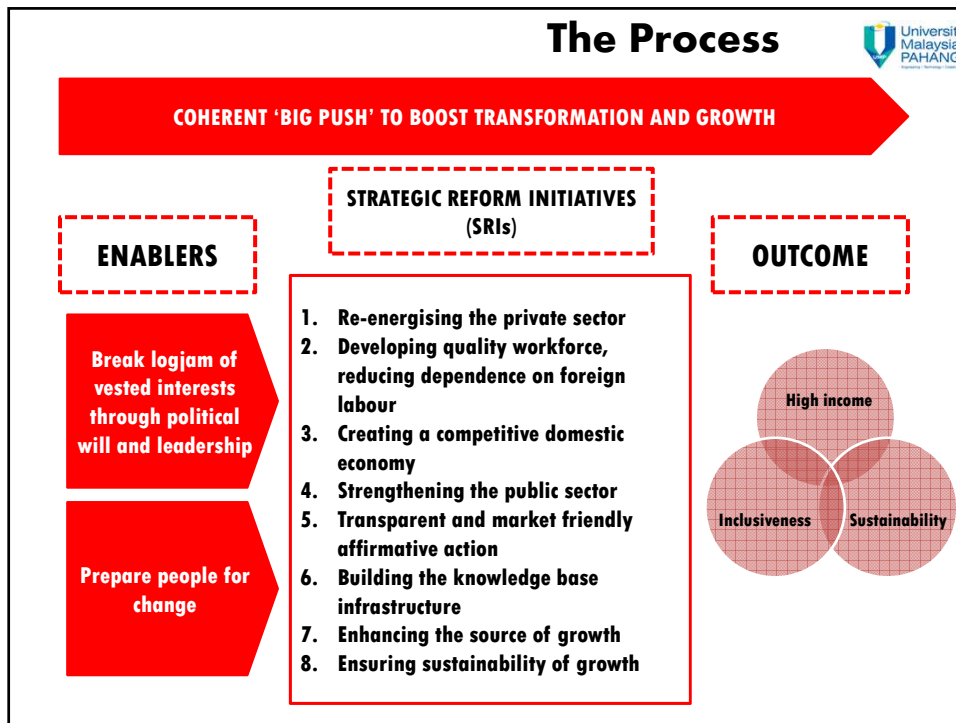
VISION 2020 NEW ECONOMIC MODEL







Source: Academia-Industry Consultative Council 8th Dec 2011






We cannot continue at the current pace unless we transform...



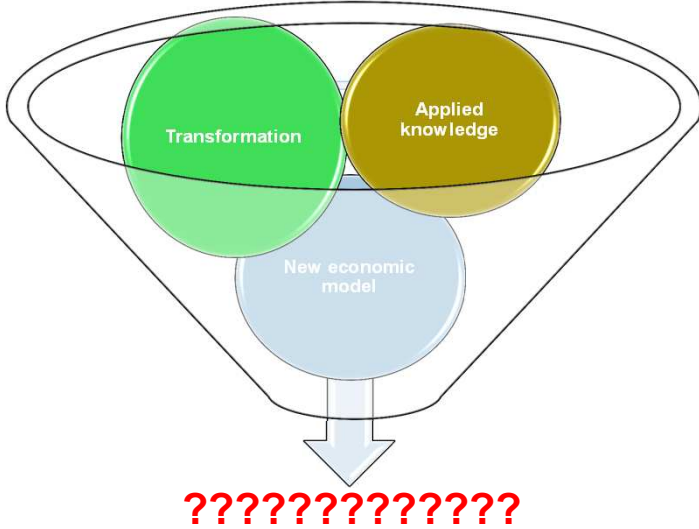
1 **NKEAs**
(drivers)
National Key Economic Areas

2 **SRIs**
(enablers)
Strategic Reform Initiatives



PEMANDU 6

What does all these mean to us?



Transformation

Applied knowledge

New economic model

??????????????

TEVT is critical in the 10th Malaysia Plan

Target

40%² skilled workforce¹ by 2020

1,031,000 more managers & professionals

1,434,000 more skilled workers

482,000 more semi-skilled workers

Policy guidelines from the 10th Malaysian Plan

Improving the Perception of TVET and Attracting More Trainees

- ...a national media campaign will be developed and rolled-out...
- 69 out of 88 technical schools will be converted into vocational schools ... six new vocational schools will be established by 2015 ...

Upgrading and Harmonising TVET Curriculum Quality in Line with Industry Requirements


- ...standardize TVET curriculum...
- Recognizing and equating various levels of Malaysian Skills Certificate with certifications issued by TVET providers
- ...a Board of Technologists Malaysia will be established
- Malaysia-Japan International Institute of Technology will be established as an independent institute

Developing Highly Effective Instructors

- Highly experienced industry personnel...to become instructors ...
- part-time working arrangements will be expanded
- ...Centre for Instructor and Advanced Skills Training (CIAST) will be expanded..
- A new centre for instructor skills training will be developed to add a further training capacity of 800 instructors each year

Streamlining Delivery of TVET

- The current funding approach of TVET will be reviewed...provide financial assistance to students to study at Malaysian Skills Certificate Level 3
- The performance rating of TVET institutions will be utilized when making decisions for buying places...in private TVET institutions
- A total of RM 150 million will be set aside to train 20,000 school dropouts during the Plan period



¹ Skilled workforce defined as those with at least SKM 3 certificate, diploma, or degree certification semi-skilled defined as those with at least SKM 1 or 2 certification, while unskilled workers have only SPM certification. A 40% target is projected by Ministry of Human Resource, and a 50% target committed to in the 10th Malaysian Plan ² Target based on MOHR estimates, different from 10th Malaysia Plan published targets of 50%

SOURCE: 10th Malaysia Plan

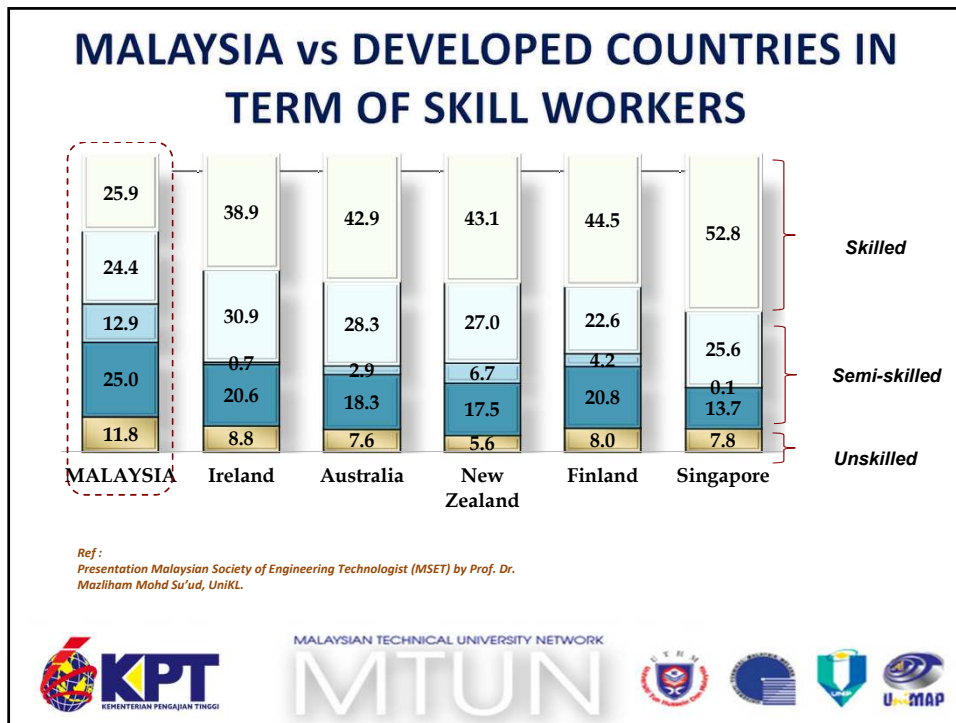
www.ump.edu.my

On the supply side, there is also a significant pool of students for expansion of TVET

Segment	Size Today Thousands	Segment description	Projected capture rate in 2020
Basic education dropouts	30¹	<ul style="list-style-type: none"> ▪ Basic education dropouts, i.e. students leaving school prior to taking SPM 	50%
SPM leavers directly entering workforce	100	<ul style="list-style-type: none"> ▪ Unskilled workers entering workforce without further qualifications, out of which 40k have no SPM credits 	30%
Foreign students	0.2	<ul style="list-style-type: none"> ▪ Foreign students coming to Malaysia for Skills Training ▪ Malaysian Skills training curriculum exported abroad 	16,000
Lifelong learning for unskilled and semi-skilled workforce	8,400	<ul style="list-style-type: none"> ▪ Upskilling of those already in workforce 	20%
Higher level SKM 3 and 4	40	<ul style="list-style-type: none"> ▪ SKM 1 and 2 holders who do not currently go on to pursue SKM 3 and 4 	50%


¹ Number of students leaving the national education system could be higher, up to 80k
 SOURCE: MOHR

www.ump.edu.my




FACTS AND FIGURES

- 40,000 skilled workers needed by 2015 in oil and gas [KSM 2013];**
- RM 3.7 billion budget 2013 technical and vocational [KPM];**
- Australia ~ AUD 2 billion annually to provide skilled workers;**



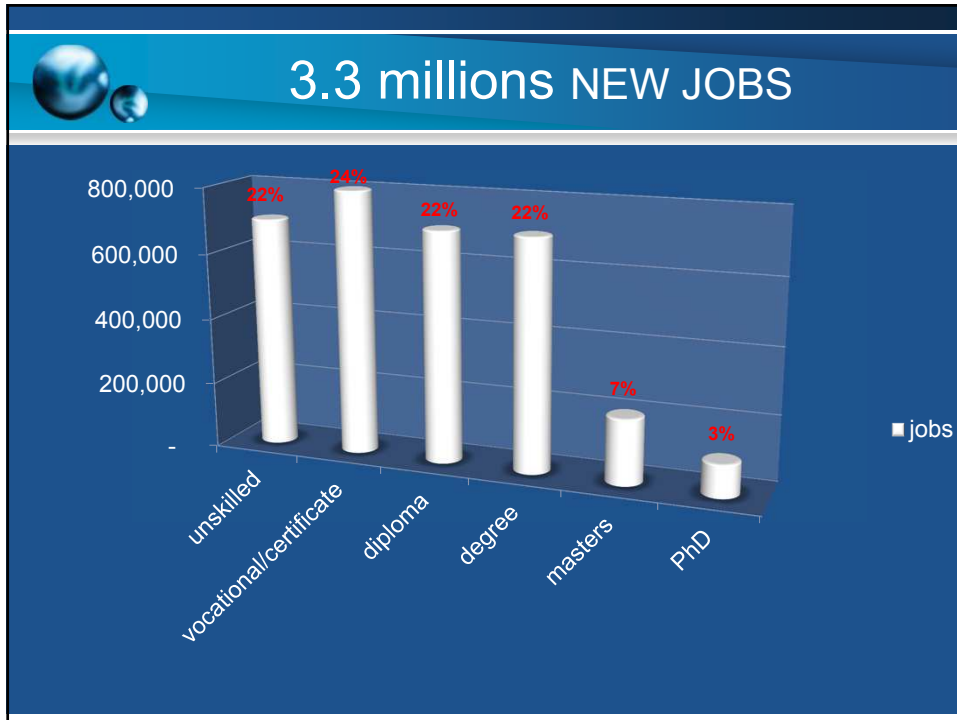
FACTS AND FIGURES

- 40% or 1.3 millions skilled worker needed by 2020 for Malaysia to be high income nation.**
- In Malaysia, 10% joined vocational and technical after high school whereas in German, Finland and Austria 50 – 80%.**
- By 2020, 1.3 million workers TVET; ~ 700,000 diploma holders from polytechnic and other institutions**



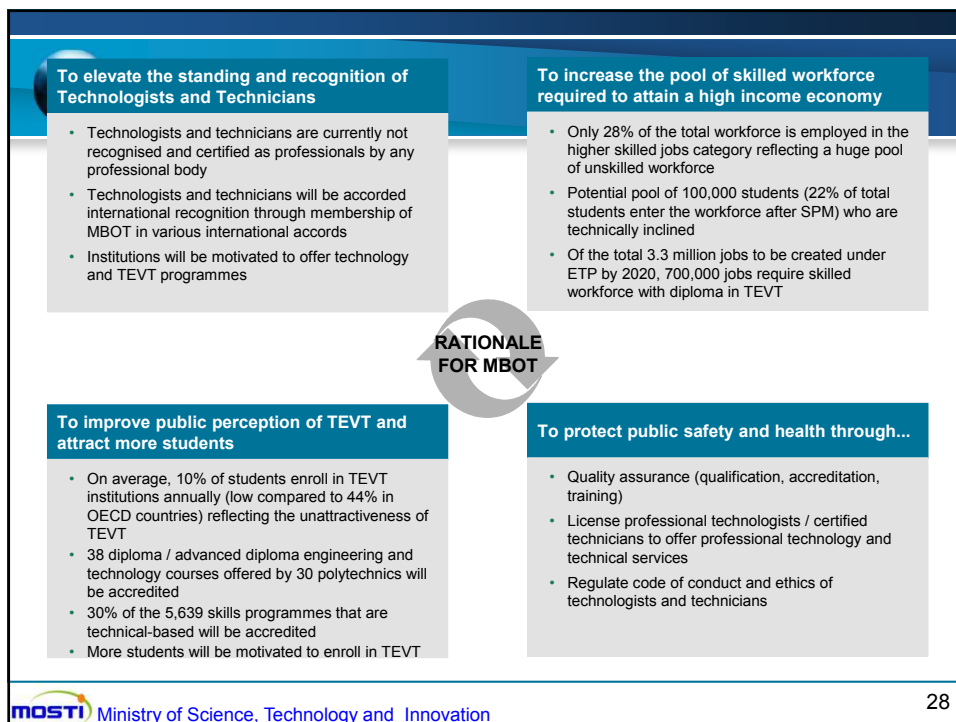
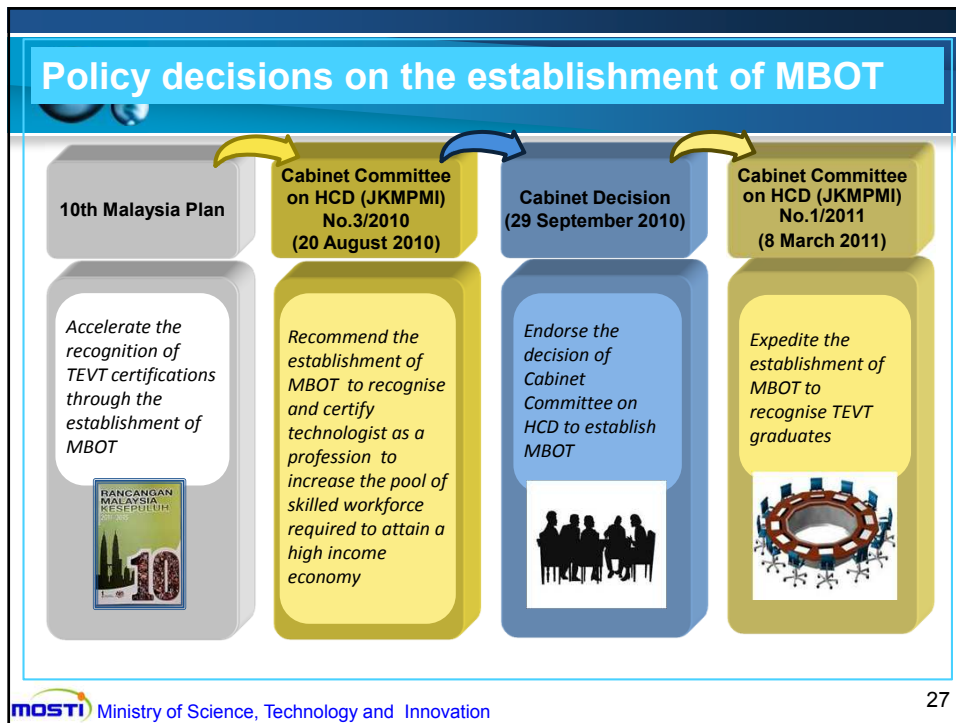
FACTS AND FIGURES

- 33% skilled workers in industrial sector by 2015 [KSU KKR]**
- 11 industry sectors NKEA**
- SCORE (Sarawak) : by 2030 requires 435,000 manpower; 52.2% skilled and semi-skilled; 70,000 engineering-related**



The Establishment of Malaysia Board of Technologists (MBOT)





Technologist, Technician and Professional Technology Services



Technologist

A person who applies knowledge of mathematics, science and technology specialisation to defined and applied procedures, processes, systems or methodologies.

Source: Adapted from International Engineering Alliance, Version 2-18 June 2009



Technician

A person in a field of technology who is proficient in the relevant skills and techniques, with a relatively practical understanding of the theoretical principles

Source: US Department of Labor Job Description



Professional Technology Services

Services provided by professional technologist in connection with product development, manufacturing, operation, product testing and commissioning, maintenance and any other areas approved by the Board.



Ministry of Science, Technology and Innovation

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ENGINEER AND ENGINEERING TECHNOLOGIST SPECTRUM


Research	Product Design	Product Development	Manufacturing	Production Testing	Technical Sale	Field Service
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ENGINEER

TECHNOLOGIST

In order to distinguish between engineering and engineering technology, a technological spectrum is used to illustrate the differences. Generally, in an organization, engineers would most likely work in the **design and development** fields while technologists, technicians and craftsmen would be more inclined to work in **manufacturing and production line**. The engineers role are more towards the left of the spectrum while the technologists are more towards the right of the spectrum although the main activities of both engineers and technologist are in the center of the spectrum.

Source : Cheshier, 1998



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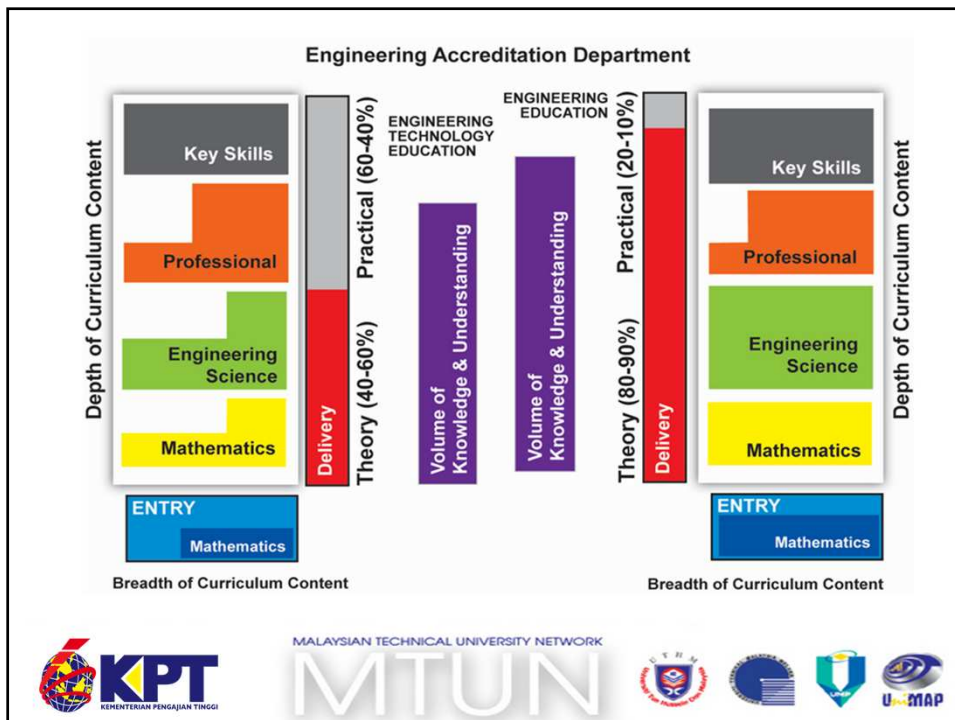
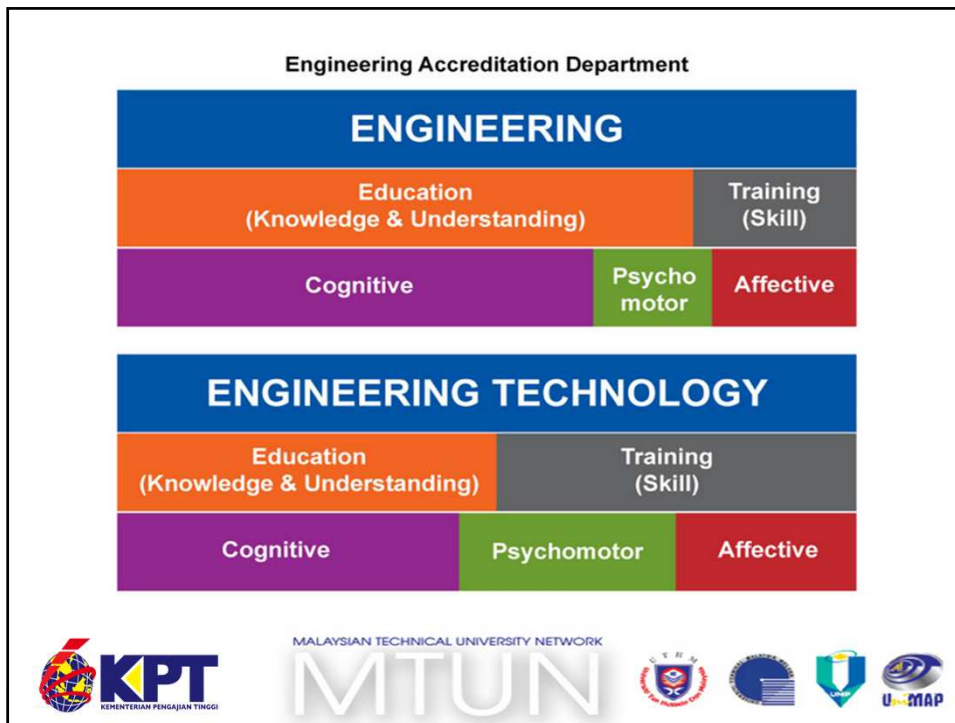
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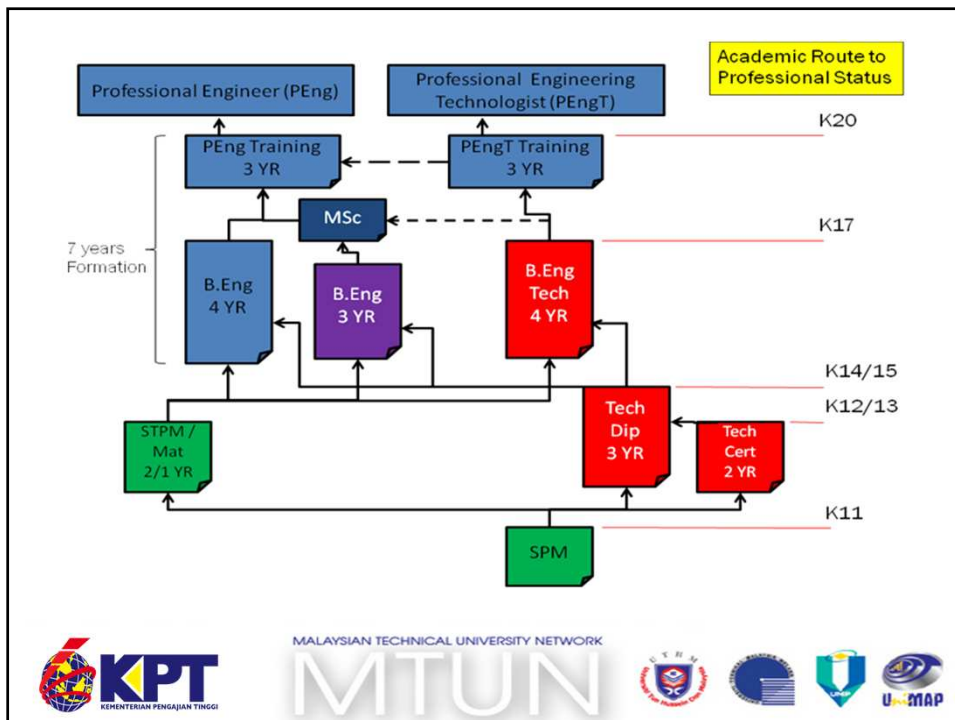
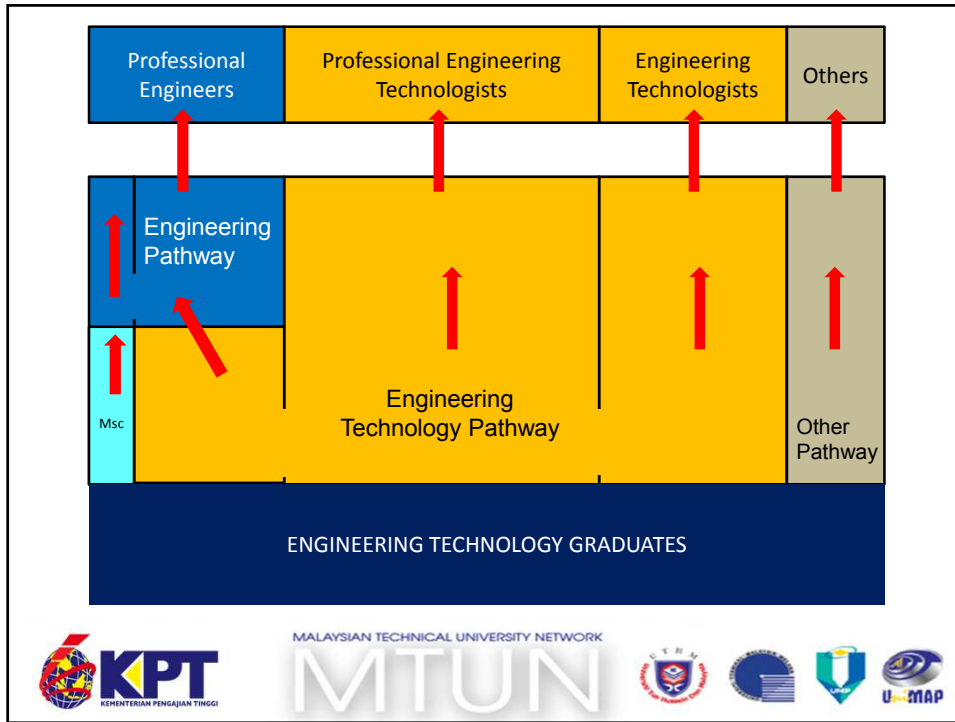
ENGINEERS	TECHNOLOGIST
<ul style="list-style-type: none"> • an engineer is a problem solver. They take basic science information and use the rules of mathematics to solve problems and design new products. • Engineers invent new technologies that revolutionize the way we handle information. They design and develop tools, toys, furniture, computers, and almost every other manufactured product that we use. They improve our buildings, roads, and vehicles. They develop systems to clean our water, process our foods, make our fuels burn more efficiently, and recycle our waste. • engineering courses enhance creativity, problem solving skills, and understanding of 	<ul style="list-style-type: none"> • Technologist are the "doers." They are workers that are highly trained to perform specific tasks. They : • design equipment, processes or systems; interpret and prepare specifications, technical drawings or instructions; prepare estimates and manage projects. • specify tests; conduct non-routine tests; develop proto types; operate pilot plants; trouble-shoot complex equipment; resolve production or construction problems; compile experimental data, or prepare reports. • supervise, train, coordinate and assume administrative responsibility for the work of others and participate in short and long range

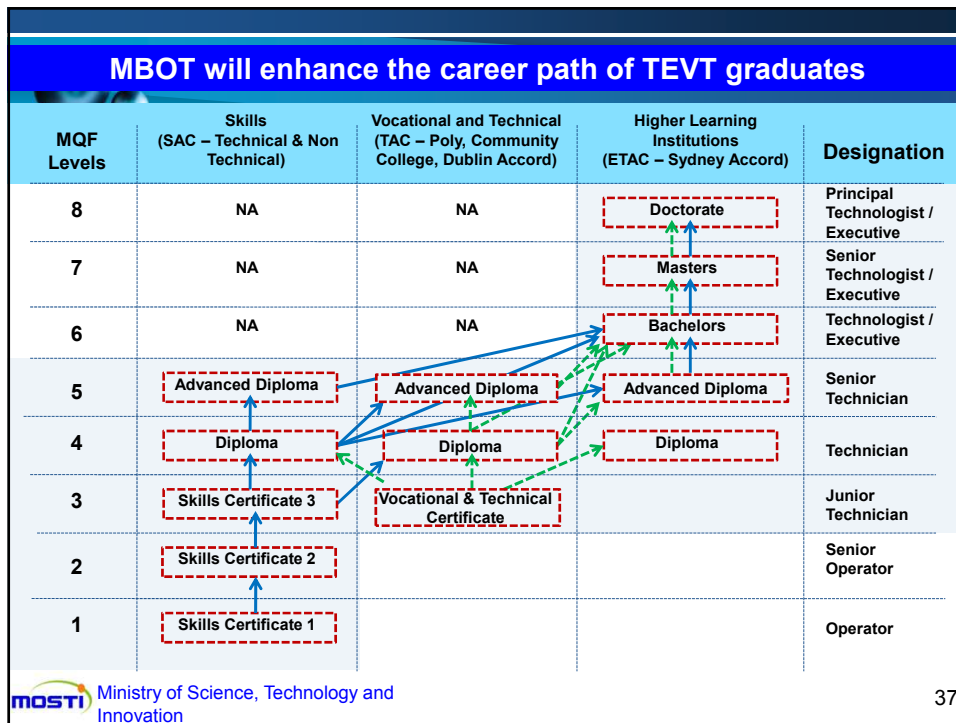
ENG & ENG TECH SPECTRUM

Distribution and Sales	Operation, Service & Maintenance	Production Engineering	Manufacturing	Component Design	Company Management	Test & Evaluation	Development & Design	Systems Integration	Analysis	Complex Design & Analysis	Theoretical Research
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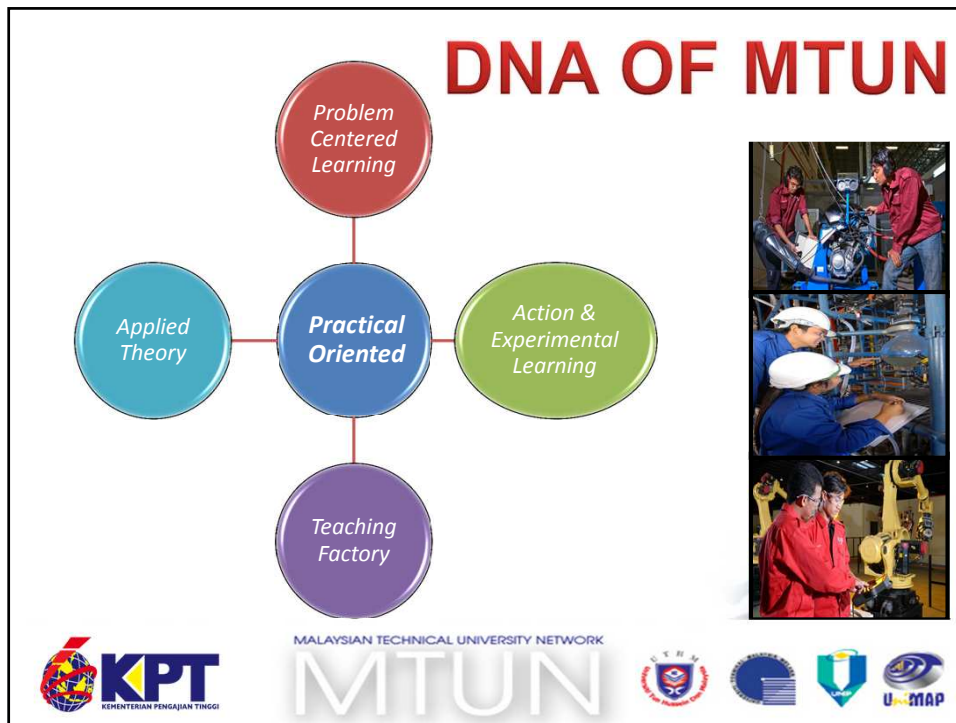






A SAMPLE OF A RELATED-INITIATIVE

MTUN AND UMP



Universities' Role

- Outreach Programs for Segments of the Community**
 - a. Socio economy
 - b. Indigenous Facilities
 - c. Single mothers
- Human Capital Development (High Income)**
 - a. Executive to technical level
 - b. MyBrain15
 - c. My3S
- Research & Development (Emphasis on Applied Research on Sustainability)**
 - a. Quality – Cost – Delivery
 - b. Commercialization
 - c. Knowledge Transfer Programme

Source: Academia-Industry Consultative Council 8th Dec 2011

**Initiative:
Industry COE**

Key Co
5%

SMI /
SME
95%

*Source: SME Annual
Report 2009/2010*


Source: Academia-Industry Consultative Council 8th Dec 2011

Human Capital Development	Institution of Higher Learning Universities, Polytechnics & Learning Institutions
	<p>Engineers & Technologist</p> <p>Technicians & Operator</p>
Research & Development	
	Centre of Excellence
	<div style="background-color: #f4b084; padding: 5px; text-align: center; font-size: small;"> Associates Partners </div> <div style="background-color: #f4b084; padding: 5px; text-align: center; font-size: small;"> Suppliers and Vendors </div>

AUTOMOTIVE ENGINEERING CENTRE (AEC)

Universiti Malaysia Pahang (Pekan Campus) , 26600 Pekan, Pahang, Malaysia
Tel: 09-424 6201 Fax : 09-424 6345

CoE CENTRE OF EXCELLENCE



VISION
Aspire to be a reputable automotive research centre internationally


MISSION

- To develop innovative automotive technology that contribute to the advancement on industry and community
- To produce outstanding postgraduate in automotive engineering field

OBJECTIVES

- To be recognised as High Impact Center of Excellence (HICoE) in automotive related researches in 5 years
- To establish networks and undertake research collaboration with local and international research institutions, universities & industries
- To develop professional innovative automotive engineering researchers and engineers with strong integrity

FOCUS AREA OF UMP'S AUTOMOTIVE ENGINEERING CENTRE (AEC)



1 BODY & TDM ENGINEERING

- Polymer based body parts
- Sheet Metal body parts
- Press Stamping Die
- Plastic Injection Mold


2 EDUCATIONAL RELATED

- Bulletin & Journal
- Apprenticeship for TDM Program
- Vehicle Component Teardown Lab for P&P


3 VEHICLE ENGINEERING & TESTING

- Component Value Engineering
- Motor Vehicle Dynamic
- Alternative Vehicle Power Train
- NVH & Dynamic Analysis
- Electric Motor Vehicles
- Vehicle & Component Testing

CoE CENTRE OF EXCELLENCE



AEC OFFICE



OVERVIEW

Centre for the research, development, testing and Training in Automotive Engineering related field.

↓

Provide technical support and engineering consultancy to Automotive related industry

↓

Focus on automotive product and tooling research & development toward achieving new technological advancement

Starting 18th Jun 2012 , AEC office has moved to Ground Floor, FKM Administration Building, UMP Pekan Campus.



Sapura ICOE – Suspension System

1. Human Capital Development

- Industrial Post Graduate – 3 Masters students
- Apprenticeship program for Under Graduate students-Lean Manufacturing
- Apprenticeship program for Diploma students

2. Research, Development & Commercialization

- Design Calculator for OE & RE shock absorber



Source: Academia-Industry Consultative Council 8th Dec 2011

